WHAT IS CLAIMED IS:

1. A pseudolite comprising:

a reference frequency oscillator;

multiple signal generators, communicatively coupled to and under the control of the reference frequency oscillator, for generating respective coherent signals at different frequencies; and

a transmitter antenna, communicatively coupled to the multiple signal generators, for transmitting the two signals at two or more distinct frequencies.

2. The pseudolite of claim **1**, wherein the signals are C/A code signals.

3. The pseudolite of claim **1**, wherein the signals are from the same family of 1023 codes as GPS satellite signals.

4. The pseudolite of claim **1**, wherein the signals are from the same family of 1023 codes as GPS satellite signals and are not L1 frequencies.

5. A multi-frequency receiver comprising:

an oscillator, defining a clock; and

multiple GPS receivers, communicatively coupled to and clocked by the oscillator, for receiving L1 (1575.42MHz) GPS C/A code signals and signals from the same family of 1023 codes as the GPS satellite signals are drawn from.

6. A receiver comprising:

multiple frequency translators, for converting signals received

on respective different multiple frequencies that are not a predetermined frequency to the predetermined frequency; and

multiple GPS receivers, communicatively coupled to respective ones of the multiple frequency translators. .

7. The receiver of claim **5**, wherein the predetermined frequency is the GPS L1 frequency (1575.42MHz).

8. A bank of N-channel GPS receivers and attached frequency converters with antennae located at a fixed and precisely known (surveyed) location, called a "Reference Receiver", that measures all of the code and carrier phase relationships between all of the signals transmitted by all of the pseudolites in view, one or more Mobile Receivers electronically configured the same as a Reference Receiver, and a data link connecting the Mobile Receivers to the phase data collected by the Reference Receiver.

9. A reference receiver joined with each pseudolite, data broadcast over RF ranging signal, no requirement for separate reference receiver and radio communications link.

10. A computational process for determining the carrier phase integer ambiguities for each received pseudolite signal that is based on the preserved and observed time and phase alignment between the code and carrier portions of the transmitted multi-frequency pseudolite signals.